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DEPARTMENT OF AGRICULTURE

ADMINISTRATION REPORT OF THE DIRECTOR OF AGRICULTURE FOR 1944.

SECTION I.

AGRICULTURE IN THE COLONY.

GENERAL.

The year 1944 was favourable from a weather point of view for agriculture generally and was in marked contrast to the two preceding years.

2. Production of rice and other food crops reached record figures. Sugar, unfortunately, suffered from the setbacks of the previous year when shortage of fertiliser, abnormal weather and labour difficulties together with restriction in manufacture, due to shipping conditions, resulted in a shortfall in production from 191,767 tons in 1942 to 132,868 tons in 1943. Although conditions in 1944 showed an improvement there has been a decline in acreage and upset in cycle balance which only time can remedy. As a consequence, yield per acre has fallen substantially and the total output for 1944 reached only 138,472 tons. Rum proved a veritable, if tenuous, life line.

3. Exceptional weather conditions from seed time to harvest yielded an excellent rice crop, although production is still below the figure required to capture West Indian markets wholly and completely. With prices fixed on grade for prompt sale and delivery to the Rice Marketing Board the tendency is to mill out the crop as early as possible after harvest, thus obtaining a finished product of good colour yielding advantageous prices to the producer. The milling problem is still the worst feature of the industry but, by next year, at least one efficient central mill will have been erected and this in the Mahaicony–Abary area where large scale mechanized trials are in progress. Problems of post-war markets are beginning to receive attention; it is more and more obvious that the Colony must produce rice at a reasonably competitive price level if it is to dispose satisfactorily of its surplus which, even though small by comparison, is already 50 per cent. of the total output—a high ratio for this type of crop.

4. War conditions, good prices guaranteed to cultivators with marketing made easy through the Government Produce Marketing Organization—all these factors have provided a stimulus to production of ground provisions. The sugar estates too have made their contribution in this regard. With the favourable weather prevailing in 1944 the results of the "Grow More Food" campaign took on the nature of an abundance especially of cassava and plantains. This was accentuated at times by the arrival of English potatoes and the subsidisation policy of maintaining the price of wheat flour at a reasonable figure. It has now been possible to relieve the sugar estates of the necessity of producing most root crops with the exception of relatively small acreages of plantains and sweet potatoes, but they are to continue the production of peas and beans —perhaps Sugar's most outstanding contribution to the food problem. The cultivation of these pulse crops is a hazardous business under local soil and climatic conditions; sowings may be repeatedly lost and crops damaged in the fields through weather and pests. Small cultivators show little interest in peas and beans even though high prices are offered.

5. The position of the coconut industry and the supply of edible oils and fats is referred to under the appropriate heading and needs little comment except to express the hope that additional extraction equipment and machinery may soon be forthcoming.

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6. In the realm of livestock much has been accomplished by comparison with some years ago but much remains to be done. While the Department has accumulated a large amount of fundamental information on the main crops sugar and rice, the livestock industry—which should be the third in importance —has not advanced to the same degree largely owing to failure in the past to accept the recommendations of the Department and to provide funds for development of the industry. However, although off to a late start, with help from Colonial Development and Welfare a concentrated attack on the many problems facing the industry, not the least of which is the spread of animal education, is now in train. On the production side, despite shortage of essential concentrates—a defect which the Department is trying to remedy by the development of balanced rations from local materials—substantial progress is being made and especially in the pig and poultry industries, both of which lend themselves to rapid methods compared with cattle. While interest in breed improvement work has heightened, the Department is making it abundantly clear that nutrition and breeding must go hand in hand if success is to be achieved.

7. In connection with nutrition investigations, reference should be made to the work in progress at Ebini Downs Livestock Station on the Berbice River. In this area there is a large tract of some 2,000 square miles of infertile sandy soil on which cattle are unable to maintain themselves and multiply; an imporant cause being inadequate intake of minerals. The problem has been tackled from three angles—feeding of minerals directly, use of Zebu in breeding up a suitable type of animal, and improvement of the herbage—the last depending on the introduction and spread of hardy palatable grasses and legumes with suitable soil treatment. The work has been in progress since 1941 when, on representations of the writer, a grant was secured from the Local Development Trust Fund to enable a start to be made. An urgent requirement is increased production of beef cattle on the interior savannahs to take the place of diminishing supplies from the coastal belt where expanding crop cultivation is encroaching on lands used hitherto for grazing. There is no doubt that initial success has been achieved from the measures adopted but the work must continue primarily with a view to securing additional information on the economics of the problem. This is a useful piece of investigation with great potentialities and has been well worth while.

8. In this brief over-all survey of 1944, a year of intensive effort in the cause of agricultural development, reference should be made to activities in the field of economics and the survey work undertaken by the Department in connection with the proposed drainage and irrigation schemes. These studies have provided the factual data which form the basis of future hopes for the coastlands of the Colony. Further reference will be found under Section II F of this report. From all these proposals there is emerging slowly perhaps, but yet perceptibly, recognition of the imperative need for the fullest collaboration on the part of all engaged in agricultural enterprise if the greatest benefit is to be reaped from the large expenditure contemplated. Indeed without such collaboration under the difficult and unusual conditions of coastland agriculture the economic picture might be the opposite of what the Colony hopes for and deserves.

Weather Conditions.

9. The mean pressure for the year was 1012.6 mbs. (29.904 inches).

10. The mean air temperature in the shade as recorded by the dry bulb thermometer for the months of March to December was higher than the mean shade temperature 80.3°F. for the past 98 years (1846-1943). The highest temperature recorded was 91.0°F. on September 12 and November 12, while the lowest was 71.0°F on January 28 and September 13. The mean shade temperature for the year was 80.9°F. which is 0.6°F. higher than the average. The total rainfall was 83.32 inches as compared with 121.92 inches in the year 1943, and with 91.34 the average precipitation for the past 64 years (1880-1943).

11. Although the total rainfall was 8.02 inches lower than the average, the months of March, June, July, September and December were respectively

higher than the average for those months. Apart from a low October and November (being 2.40 and 3.83 inches respectively below the average) and a dry first week in December, the rainfall was well distributed over the year. Rain fell on 202 days of the year as compared with 227 days in 1943.

12. The evaporation from a free water surface, a six feet square tank at the ground level, was 57.84 inches as compared with 57.73 inches the average evaporation for the past 28 years (1916-1943). The evaporation for 1944 was 69.42 per cent. of the total rainfall.

13. The total amount of bright sunshine for the year was 2,417.2 hours, as compared with 2,348.3 hours in 1943 and with 2,400.1 hours in 1942 and was 53.0 hours lower than the average from 1846-1943.

14. The mean radiation temperature blackened bulb in vacuo was 3.5°F. higher than normal and 0.7°F. higher than the previous year.

15. The mean maximum record during the year was 151.3°F. in December, while the highest daily record 160.0°F. occurred on August 15 and November 7.

16. The mean velocity of the wind was 5.29 miles per hour. The maximum velocity recorded by the anemograph was 29.08 miles per per hour at 1.10 p.m. on Saturday, July 8.

17. The mean rainfall for 1944 on the coastal area of the three counties is as follows:—Berbice 74.15 inches, Demerara 83.23 inches, and Essequibo 96.28 inches.

AGRICULTURAL INDUSTRIES.

SUGAR.

18. The principal statistics of the sugar industry for the years 1943 and 1944 are presented in Tables I and II. There was a marked drop in the yield per acre and in total output, both attributable mainly to shortage of fertiliser and labour and to the flood conditions which prevailed in late 1943 and early 1944. Labour difficulties have also led to a decline in the acreage and to upset on the cycle balance, since the proper proportion of plant cane fields could not be started, albeit there is improvement in this last respect for 1945. Cane-farming has had its share of the difficulties mentioned and has suffered a severe setback.

19. Molasses exports have dwindled but there has been a brisk demand for rum.

TABLE I.

CANE ACREAGES REAPED, PRODUCTION OF SUGAR, YIELD PER ACRE, AND RUM PRODUCED IN BRITISH GUIANA DURING 1943 AND 1944.

Year	Area Reaped (inclusive of farmers' canes)—English Acres.			Sugar Produced (inclusive of farmers' canes)—tons.			Yield per acre—tons.			Rum produced—Proof Gallons.		
	Berbice.	Demerara.	Total Colony.	Berbice.	Demerara.	Total Colony.	Berbice.	Demerara.	Total Colony.	Berbice.	Demerara.	Total Colony
1943	23,133	39,502	62,635	57,331	75,537	132,868	3.11*	2.39*	2.66*	922,979	1,488,838	2,411,817
1944	24,583	36,160	60,743	60,190	78,282	138,472	2.45	2.16	2.28	1,459,429	1,632,734	3,092,163

*based on potential output of 166,422 tons.

TABLE II.

EXPORTS OF SUGAR, RUM, MOLASSES AND MOLASCUIT, 1943 AND 1944.

Year.	Sugar.			Rum.		Molasses		Molascuit.	
	Tons.	Value in $	Value per ton in $	Proof Gallons.	Value in $	Gallons.	Value in $	Tons.	Value in $
1943	131,187	7,519,090	57.32	1,472,208	947,246	92	38	....	....
1944	177,995	10,961,784	61.58	2,175,520	2,170,751	1,664,421	130,408	....	....

20. The 1944 area in cane was divided among the varieties as follows: P.O.J. 2878, 65.1 per cent.; Diamond 10, 25.5 per cent.; D. 166/34, 2.2 per cent.; Co. 419, 3 per cent. Co. 421, 3 per cent.; other canes 2.6 per cent.

21. The consumption of local sugar in the Colony was 13,593 tons in 1944 as compared with 13,541 tons in 1943.

RICE.

22. The estimated area in rice was 76,543 acres, and including the Spring crop, with its large percentage of volunteer growth, the total area reaped in the Colony for the year was 91,729 acres. Calculating the yield of clean rice at 60 per cent of padi, an estimated figure of 58,942 tons of rice is obtained. It would appear, however, that as a result of imported stock feed shortage a goodly amount of padi was disposed of as such and not actually milled. Weather conditions were excellent for the reaping of the Autumn crop due to a prolonged spell of dry weather, and a good crop was obtained throughout the Colony. The distribution of pure line seed to farmers *on an exchange basis* was tried for the first time. The amount so distributed was limited, supplies being affected by bad weather when the seed was reaped the previous year. Manurial experiments for low-yielding areas are stressing the value of rice straw broken down with the aid of ploughing oxen; optimum cultural practices such as age of transplanting, spacing, number of seedlings per hole have now been definitely established, and the information has been passed on to the farmers.

23. The Rice Marketing Board continued to be the sole agent for handling rice. Prices paid by the Board for the Autumn crop per bag of 180 lb. in consignments of 50 bags and over remained the same as in 1943.

24. Table III gives the returns of acreage reaped in the three counties, production and exports during 1943 and 1944.

TABLE III.

RICE ACREAGES, PRODUCTION AND EXPORTS, 1943 AND 1944.

Year.	Area Reaped (Spring and Autumn Crops) English Acres (Estimated).				British Guiana total acreage (reaped)	Yields. (Estimated)		Exports.				
	Berbice.	Demerara.	Essequibo			Padi tons	Rice tons (60% yield of clean Rice from Padi)	Rice.			Padi	
			Mainland.	Islands.				Tons.	Total value $	Value per ton $	Lb.	Total value $
1943	32,591	24,880	15,656	12,857	85,984	87,632	52,579	17,180	1,699,963	98.95	....	....
1944	36,584	31,766	10,145	13,234	91,729	98,237	58,942	24,593	2,665,481	108.38	22,740	600

Coconuts.

25. Coconuts third in importance of all crops in the Colony and first in importance of permanent crops, occupied an area of approximately 34,625 acres in 1944. The view was widely held among growers that due to labour shortage at least 20 per cent. of the coconut crop was left in the field as nuts. This loss even on a conservative estimate would be equivalent to about 9,000,000 nuts which could have yielded not less than 4,800 drums of edible oil.

26. The production of copra during the year, based on receipts by brokers, was over 2,586 tons. This was an increase over previous production and was attributed to the high price obtained for copra exported to non-sterling markets in the early part of the year. During the latter part of the year increasing attention had to be focussed on the fact that edible oils and fats were in such short supply that the British Caribbean was unlikely to obtain supplies from outside sources. The region could be made self-sufficient only if planning in regard to rationalization of supplies between producing and consuming colonies was introduced. To this end an inter-colonial Conference, to be held in Barbados early in the new year, was summoned by the Comptroller of Development and Welfare.

27. A weak point in the economy of the industry continued to be the low standard of oil extraction from a large proportion of the crop. Interesting results with the production of a balanced ration including copra meal were being obtained from trials by the Department.

Coffee.

28. It is estimated that the area under coffee was approximately 3,397 acres, distributed mainly as follows:—North West District 1,391; Pomeroon 762; and Canals 1,282; almost all of the Liberian variety. Estimated local production was approximately 500,000 lb. and of this total 180,000 lb. were purchased by the Government Produce Depot from farmers in the above-mentioned areas. The labour shortage in the North West District continued to be acute, and a considerable proportion of the crop remained unpicked. Shipments from this district to Georgetown totalled 787 bags as compared with 1,283 bags in 1943. The Commodity Control Organization imported 785 bags during the year. The price paid to farmers was 11 cents per lb., and it was retailed at 14 cents, these prices being the same as in 1943.

Citrus and Other Fruit.

29. The area under grapefruit, oranges, limes and other fruit was returned at 6,169 acres. Supply did not fully come up to demand, and oranges were imported during the year from both Trinidad and Surinam. A total of 88,331 lb. was imported altogether, approximately 50,000 of this being from Trinidad, and the remainder from Surinam. The distribution of budded and grafted fruit trees by the Department was continued during the year, over 2,000 budded citrus being sent out, a marked improvement over 1943 when the nurseries were flooded (see para. 48).

Provision Crops.

30. The area under mixed provision and other food crops, including corn and pulses, was returned at 22,867 acres. Weather conditions during the year were very favourable and production exceeded that of 1943. Overproduction of plantains and sweet cassava occurred during the latter half of the year; surpluses of both crops were disposed of to pig-keepers at low cost, and some plantains were also exported to Trinidad. Production of pulses by sugar estates was more successful this year, approximately 580,000 lb. being produced from over 2,000 acres as against 600,000 lb. from over 4,000 acres in 1943 when weather conditions were most unfavourable. The purchase of four lorries by the Marketing Organization led to a great improvement in the orderly marketing of produce from estates and villages. Further details will be found under the working of the Marketing Branch. (Section II. B).

Large quantities of vegetable seeds were again sold by the Department, in addition to those distributed free by district sub-stations and the District Food Committees. (See para. 48).

RUBBER

31. Mr. M. A. Cheek, British Guiana Manager of the Rubber Development Corporation, has kindly supplied the following information:

32. "Our average monthly production now varies from 20,000 to 30,000 lb., depending upon weather conditions and availability of labour, and is derived from approximately 31 producing properties.

33. The system of tapping is an inclined cut from left to right down to about 30° angle, the cut encompassing half the circumference of the tree. This is called a half spiral cut. Incisions are made daily but if weather conditions and labour were more constant, the alternate daily system of tapping would be employed.

34. The average yield per tree per tapping is approximately 44 c.c. of latex. A few trees yield as much as a pint of latex per tapping. The average dry rubber content per gallon of latex varied between 3¼ and 3½ pounds.

35. Tapping tasks vary from 125 to 200 trees, but a few tappers do more. This contrasts with the number of trees per task in the East Indies which varies from 250 to 400 trees bled every morning by the rubber collector.

36. The potential yield of mature Hevea seedlings in British Guiana compares favourably with those of the East Indies, but because the tasks in British Guiana are small, the operators less proficient and their tendency to be late in arriving at their tasks, the daily production per individual tapper is less than half of what it is in Malaya.

37. The quality of rubber is equal to that produced in the East Indies. The small producer in British Guiana turns out rubber of slightly better quality, i.e., cleaner, than does the native producer of the East Indies, while the larger producer delivers rubber which compares favourably with that of European estates in the East Indies."

38. Shipments of rubber from British Guiana totalled 288,570 lb. in 1944.

LIVESTOCK.

39. *Beef Cattle.* The number of cattle slaughtered in Georgetown in 1944 was 6,743, an average of 562 per month. 1,693 Brazilian cattle were imported and, of these, 1,610 were slaughtered in Georgetown to supplement the local requirements. The prices paid the producers varied, according to the quality of the animal for slaughter, from six cents to nine cents per lb. live weight; the price to the consumer for beef varied from 14c. to 22c. per lb.

40. *Dairy Cattle.* Competitions were held in all the Districts except Essequibo, and the standard of the entries showed a marked improvement over 1943. The establishment of more breeding centres was proceeded with, and services by bulls at those stations numbered 1,058 in 1944 as against 713 in 1943. 220 cows belonging to farmers were also served at the Livestock Farm, Georgetown. Some sugar estates are showing more interest in dairying, and stock in hand at the end of the year totalled 1,145, an increase over the commencing stocks of 190. The price paid to the producers for milk varied from 36c. per gallon in the country districts to 54c. per gallon delivered to the Government Milk Depot, Georgetown. The retail milk price was eight cents per pint or 64c. per gallon in Georgetown. At the beginning of the year the supply of decorticated cotton seed meal and linseed oil meal, which arrived towards the end of 1943, became very limited, and, in order to ensure equitable distribution, these concentrates had to be sold entirely through the Government Produce Depot, and only to farmers certified by the Livestock Officer and Milk Controller as *bona fide* milk producers. After the first three months, the

position was eased by the arrival of fresh consignments, and in April it was found possible to do away with the control on sales of cotton seed meal. In June linseed oil meal was likewise decontrolled. The position remained satisfactory until towards the end of the year, when it began to show signs of deterioration, especially as regards linseed oil meal. Supplies of the above two concentrates were supplemented by the arrival in April of 100 tons of meat and bone meal, ordered by the Department in 1943 from the Argentine in order to meet the shortage of protein feeds in the Colony. Under the name of "Pig Supplement," this feeding stuff was made available at approximately cost price first to those sugar estates rearing pigs for the "Grow More Food Campaign," and to peasants and small-scale pig-rearers. Further particulars will be found under the Marketing Branch.

41. *Pigs.* The number of pigs slaughtered in Georgetown surpassed the 1943 record of 9,321. The 1944 figure was 11,910, a monthly average of 992. The demand for Berkshire breeding stock from the Department continued to increase, while boars at the various breeding centres were fully used. Sugar estates notably increased their production of pigs. Starting the year with 947, they ended with 1,746; sales of pigs from estates totalled 701. Processing of bacon and ham and other meats continued. Producers' prices for pigs for slaughter varied from 21c. to 23c. per lb. live weight. The controlled retail price of pork is 28c. per lb.

42. *Poultry.* The distribution to the public of pure bred chickens and cockerels continued. 11,991 were sold in 1944 as compared with 9,960 in 1943. The two breeds kept on the Livestock Farm are Barred Plymouth Rocks and Rhode Island Reds. The 3,000 egg incubator was working throughout the year. There was no surplus of poultry and eggs for export and local prices are still encouraging to producers. Demand has increased during the war with the requirements of the armed forces in the Colony to be met. The retail price of poultry varied between 35c. and 48c. per lb. live weight. Eggs were usually five for 24c.

43. *Census.* The Livestock returns for 1944 were:—Cattle 171,719; horses 2,856; buffaloes 206; goats 13,486; asses 7,690; mules 1,597; sheep 37,125; swine 45,698.

SECTION II

WORK OF THE DEPARTMENT OF AGRICULTURE

A. The Field Branch

General District and Food Production Work.

44. Much time once again has been spent by District Agricultural Officers on work connected with the "Grow More Food Campaign" not only in advisory services but also in the distribution of agricultural tools and inspections in connection with the issue of barbed wire, ploughs and plough parts. Works being carried out with funds provided to the District Committees by the Legislative Council Food Production Committee, were also inspected frequently. Experiment stations, sub-stations, demonstration plots, breeding centres and soiling units were maintained throughout the year and this work is expanding. Special mention should be made of the new developments in the Bartica-Potaro District, where despite a patchy soil of low fertility and difficulties with Coushi ants, efforts are being made to encourage self-sufficiency. A demonstration five acre unit is being established with the object of demonstrating to cultivators how a mixed holding including livestock should be operated and how soil erosion can be prevented on these rolling lands. It should be explained that this is a mining and forest area and not a strictly agricultural one. Agricultural officers were also Chairmen of the various Co-operative Credit Bank Committees throughout the Colony.

45. *District Committees.* The nine District Food Committees continued to be active throughout the year, and as a result of their efforts, approximately 6,000 additional acres ($\frac{1}{3}$ rice, $\frac{2}{3}$ ground provisions) were secured for cultivation in 1944. During the year expenditure by District Committees totalled $51,929.69, made up as follows:—

Drainage and Irrigation works	$20,976.89
Loans and grants to farmers	11,661.99
Free planting material	7,958.25
Miscellaneous	11,332.56
	$51,929.69

46. *Sugar Estates.* Satisfactory progress has been achieved by sugar estates, both in the production of pigs, dairy and beef cattle, and ground provisions and pulses. 578,522 lb. of peas and beans, and 4,423,752 lb. of ground provisions were produced by estates during the year. A total of 2,488 acres in peas and beans, and 2,229 acres in ground provisions, were put under cultivation by sugar estates.

47. Details of activities of District Food Committees and sugar estates may be found in the report of the Department's Food Production Officer for 1944, published separately. The activities of the Legislative Council Food Production Committee are also recorded therein. His Excellency the Governor is Chairman of this Committee of which the Director of Agriculture is a member and the controlling authority of expenditure.

Seed and Plant Distribution.

48. Distribution of vegetable seeds, fruit plants and planting material of ground provision crops from the Botanic Gardens and the Department's substations as well as by District Agricultural Officers through funds provided by the Legislative Council Food Production Committee were as follows :—

Peas and beans	lb.	56,447
Vegetable seeds (packets)	No.	17,864
" " (seedlings)	No.	4,375
" " (cuttings)	No.	1,412
" "	lb.	113
Plantain suckers	No.	115,424
Banana "	No.	18,700
Cassava sticks	No.	107,300
Tannias (suckers)	No.	32,001
"	lb.	20,871
Yams	lb.	13,722
" (plants)	No.	400
Eddoes	lb.	120,636
" (suckers)	No.	25,150
Maize	lb.	940
Sweet Potatoes	lb.	562
" "	bndls.	292
Shallots	lb.	1,069
Budded citrus (plants)	No.	2,137
Grafted mangoes (plants)	No.	194
Grafted avocadoes (plants)	No.	63
Miscellaneous fruit (plants)	No.	4,836
Ornamental plants	No.	6,003
Bamboo	bndls.	157

49. *Distribution of Pure Line Padi.* The distribution of pure line seed padi to farmers of this Colony *on an exchange basis* in collaboration with the Rice Marketing Board was tried for the first time for the planting of the 1944 Autumn crop. Due to adverse weather conditions during reaping, as indicated in the 1943 report, much of the seed was damaged, and only 12,171 bags (out of 32,510 reaped) were distributed. The 1944 Autumn crop at Anna Regina estates, where 1,629 acres were grown by tenants under the aegis of the Department produced 28,842 bags of good seed which will be distributed for the 1945 Autumn crop. The purity of this padi, the roguing of which was carefully supervised by the Department's Officers, was of a very high standard,

averaging 98 per cent. The three varieties in commercial production are D.110, No. 79 and Blue Stick. Additional figures are given in para. 52.

Cane-Farming.

50. As mentioned earlier, there has been a severe decline in the cane-farming industry, especially on the East Coast of Demerara where it normally plays a major role in peasant economy. As a contribution towards remedying the situation Government provided a Cane-farming Officer from May 1, and Mr. E. G. B. Jones, D.I.C.T.A., a Senior Agricultural Instructor, who had formerly been a field assistant at the Sugar Experiment Station, was seconded for the purpose.

Soon after his appointment, the Cane-farming Officer collaborated with the Agricultural Superintendent for East Demerara in surveying the cane-farming conditions in Plaisance, Beterverwagting-Triumph, Buxton-Friendship, and Golden Grove-Nabaclis, under the supervision of the Sugar Agronomist and Plant Breeder. These officers found that replanting had been neglected for some time, that farmers were not growing the new improved varieties, that many of the drainage and irrigation canals were too shallow and that there was little prospect of a satisfactory future if the practice of flood-fallowing, now standard on the estates, could not be introduced. As a result, a number of proposals for Government's assistance and intervention in remedying the situation have been submitted to the proper authorities.

Land Settlement.

51. *Toevlugt Farm Unit.* This farm unit was satisfactorily maintained throughout the year especially as there were regular showers of rain during the first half which allowed for planting to be carried out. The Ceylon variety of coconut continues to die out and this will be replaced by other fruit trees. The following planting materials were distributed to farmers during the year:—800 pineapple plants; 2,370 cuttings of Guatemala grass; 14 dozen cobs of corn; 156 plantain suckers; 156 banana suckers; 6,000 sweet potato cuttings; 675 sticks of bitter cassava and 880 sweet cassava sticks.

52. *Anna Regina Estates.* The area under cultivation at the Spring crop was 636 acres, 576 of which were for pure line seed production, made up as follows:—Blue Stick 180 acres: D. 110, 237 acres; and No. 79, 159 acres. The Spring crop yields are usually unreliable and returns from the D.110 and No. 79 varieties were low. Blue Stick averaged 14 bags per acre, the difference in yields can be accounted for by the fact that the D.110 and No. 79 varieties required heavy roguing as they were only introduced here in 1943, whereas the former has been firmly established for a number of years. The total number of bags purchased from the tenants for the Spring crop was 8,864 for $23,819.98 or an average price of $2.68 per bag of 155 lb. gross.

53. At the Autumn crop a total of 1,628 acres were planted in pure line seed padi. The acreage planted was divided up as follows:—D.110, 1,040 acres; No. 79, 471 acres and Blue Stick 117 acres. Weather during the planting, growing and reaping of this crop favoured most of the operations. The bulk of the padi reaped was purchased as pure line seed. The yield averaged just over 20 bags of 155 lb. gross per acre, and the total purchased was 34,603 bags for $95,652.22 which shows an average price of $2.76 per bag. This is only the second year of pure line seed production on such a big scale and it is gratifying to note that an excellent standard of purity was maintained in all varieties. Randomised samples taken during the harvesting of the Autumn crop showed D.110—98 per cent.; No. 79—98 and Blue Stick 99. Unfortunately storage facilities leave much to be desired and the attention of those concerned has been called to this special need.

54. Progress was made under Colonial Development and Welfare Scheme D.157, although completion of the housing on the individual holdings experiment has been delayed for various reasons. Satisfactory progress has been made with the establishment of one community cow pen, and the attached community forage block. The plan is to house tenants' milking animals in these pens and to use Holstein-Zebu bulls for improving their milch cattle. At the time of writing the ghee plant is under construction.

55. During the year a scheme was submitted to Government urging the gradual demolition of the ranges that house the tenants of the estate, the proper laying out of the old yards and building of model cottages with small holdings of one-third of an acre.

56. *Bush Lot Settlement (Anna Regina).* This settlement continues to show satisfactory progress and there are now very few tenants who have not cleared their old debts to Government. The houses all need repairing and funds have been asked for to carry out urgent repairs. The population of the settlement was 234 at 31st December 1944 as against 226 in 1942.

57. *La Belle Alliance (Anna Regina).* On this section of the estate is operated a properly paddocked and controlled agistment area; it is capable of carrying 500 tenants' cattle and an experiment is in operation using dual purpose bulls. The Red Poll has been tried for some years now and the results so far have been promising. Pure-bred Zebus have recently been introduced to strengthen the Red Poll crosses under a definite breeding policy, the whole idea being to produce, if possible, a good utility type useful as a draft animal but yielding more milk than the average creole cow and tending to earlier maturity for slaughter purposes. This progeny will be tested alongside Holstein-Zebu creole crosses. (See also para. 119).

Beekfeping and Preserves.

58. The Department continued to work in these industries in close and helpful collaboration with the Association formed of small producers. The honey crop reached the expected level in some areas but in others was low. In the latter areas one of the contributing factors was difficulties of travel; some of the Colony's large beekeepers now operate out-apiaries and it is in connection with these that difficulties such as gasolene rationing, tyre shortage, reduced bus and train services have been most felt.

59. The Department's work at the Demonstration and Queen Breeding Apiary continued. During the year 124 queens descended from imported Italian queens were distributed. The small grant from the Colonial Development and Welfare Fund was of assistance in building up apiaries in areas considered to be suitable for honey production but which had not in the past been tapped.

This grant also enabled the Department to expand bee education work in rural areas. One of the problems to which the Association and the Department were at the end of the year addressing themselves was the marketing of supplies and storing of stocks. Although honey and wax are products which can be stored satisfactorily, the small producer likes to be in a position to realize cash for his crop within a reasonably short time after his crop has been harvested. In this particular, the beekeeper is, perhaps, no different from other small producers.

60. For preserves-makers, the year has on the whole been disappointing. Due to difficulties in obtaining suitable containers and covers producers have been unable to take full advantage of market opportunities.

Botanic Gardens and Nurseries.

61. Weather conditions throughout the year under review were generally more favourable for gardening operations and plant growth than the preceding year. Generally speaking all the gardens under the supervision of the Curator, Botanic Gardens, were maintained in good condition; the lawns showing a notable improvement. This is largely attributed to better weather conditions and better organisation and planning. No serious losses were sustained through insect pests and fungus diseases. The propagation of sour orange stocks was regulated to avoid periods of exceptionally wet weather, which is chiefly responsible for the losses caused by "Damping Off Disease" of seedlings. Some 3,000 budded citrus plants were raised during the year. Of this amount 2,137 plants were sold and distributed. Although the output of nursery stock was greater than in previous years, the year closed with a considerable number of orders

for citrus, Avocado pears, and mangoes still outstanding. In the vegetable nursery and demonstration plot, fair crops of most of the ordinary green vegetables were produced. The tomato again proved a complete failure, even although the plants were grown under a variety of methods. Fusarium "wilt" appears to be the cause of the trouble. Cabbage too proved difficult on the clay soils.

62. To facilitate the investigation of fodder pasture and lawn grasses a collection of 59 species of indigenous and imported grasses has been established in the Botanic Gardens. It is planned to extend this collection still further.

63. Several improvements were effected in the Botanic Gardens proper in opening up areas which were previously overcrowded. Plantings of annual flowering plants gave a good display especially during the early part of the year. A special allocation of $4,000 was made for the reconditioning of the two side roads through the Park Lands. This work was completed. The allocation for the upkeep of Government Gardens and Grounds in the Colony was substantially increased for the year 1944 from $2,038 to $4,600. Gardens and Grounds included under this heading are:—Government House gardens; Public Buildings; Victoria Law Courts; Magistrates Court, Georgetown; Audit Department; Education Department; Head Office, Department of Agriculture and Director of Agriculture's Compound; New Amsterdam Public Gardens and the Rest House No. 63, Corentyne.

64. Plants under trial included the Dwarf Kapok (*Ceiba pentandra*) of which 400 trees were raised in the Botanic Gardens nursery and planted at Bartica and Anna Regina. The Christophine (*Sechium edule*) has not proved a success. The plants invariably die after producing a small crop of fruit. *Cryptostegia grandiflora* has grown well at all district stations. Plants of the wild cassava *Manihot saxicola* and *M. melanobasis* continue to grow well. *M. saxicola* can now be raised from cuttings but the propagation of *M. melanobasis* is still proving very difficult.

Agricultural Education.

65. *Garden and Stock Competitions.* There were no field days held during the year on account of transportation difficulties. A vote of $1,500 was provided for competitions, *viz.*, vegetable gardens and livestock. Vegetable garden competitions were held in Eastern Berbice; East Bank and West Coast, Demerara and the Essequebo Coast and Islands; poultry competitions were held in the North West District and the East Bank, Demerara; livestock competitions were held in Eastern Berbice, East and West Coast Demerara. In order to encourage livestock expansion, stock pen competitions were held in the East Coast Demerara and prizes were given for the best stock pens made of local material. At the time of judging lectures and talks were given by the specialist officers of the Department.

66. *School Gardens.* Satisfactory progress has been made at some of the registered School Gardens during the year, but there are certain gardens where very little if any extensive effort was evident. There are 53 registered School Gardens, 31 of which receive grants from the Department of Agriculture; the remaining 22 receive grants from the Education Department under Regulation 18 of the code. Some parents have objected strongly to their children working in School Gardens, and, as a result, in some districts, gardens have been badly neglected. Gardening is not compulsory in the Schools.

67. *Apprentices.* Six more apprentices were taken on for training under the scheme which has been in operation for some years.

B.—The Marketing Branch.

68. The establishment during 1944 of an executive Board or Committee to control the Government Produce Depot Organization was forecast in last year's report. Such a body was not formed during the year but in March a temporary *ad hoc* Committee was appointed to supervise the activities of the Depôts and the marketing scheme pending the establishment of a Board with executive powers. This *ad hoc* Committee, which was also requested to submit recom-

mendations for legislation, staffing, etc., in connection with the activities of the Depôts, was constituted as follows:—Hon. J. I. de Agniar (Chairman); Director of Agriculture (Deputy-Chairman); Deputy Colonial Treasurer, Marketing Officer and Mr. John Fernandes. By the end of 1944 the Committee had held 18 meetings and had dealt with a wide range of important matters as well as supervising Depôt activities. Proposals for more adequate staffing of the Depôt Organisation were submitted to Government, approved and put into effect; draft legislation involving the setting up of an Agricultural Products Marketing Board was agreed on and submitted; while the Committee also dealt with questions of produce importations and exportations and of guaranteed prices to farmers for certain agricultural products. At the time of writing the Committee continues to function with the original personnel; meetings are held fortnightly or more frequently when necessary.

69. There was an acute but temporary shortage of ground provisions during the early months of 1944 and special efforts were made by the Depôt Organization to increase the flow of such supplies to Georgetown where the shortage was most felt. Lorries were purchased and operated as mobile Depôts, a large number of buying points were established in most producing areas, and for a time farmers in country districts were paid the maximum prices allowed in Georgetown for ground provisions and plantains. The Georgetown Depôt's retail section was enlarged and a further branch opened at Kitty. Ground provision supplies increased rapidly from about June onwards and for the last few months of the year the quantities of sweet cassava marketed were far in excess of demand; resumption of plantain exports to Trinidad after a lapse of nearly two years became possible in September and some 90,000 bunches were exported in the last four months of 1944.

70. The Government Produce Depôt Organization continued to expand but as in previous years its activities were confined to a limited range of farm products. Purchases from farmers and estates of the main types of produce handled are given in the following table:

	Georgetown Depôt	*New Amsterdam Depôt*
Ground provisions and plantains	3,436 tons	214 tons
Black eye peas	85 tons	36 tons
Other pulses	66 tons	3 tons
Corn (dried, shelled)	104 tons	33 tons
Coffee beans	56 tons	15 tons

The Georgetown Depôt figures given above include purchases at country depôts and buying points in Demerara, Essequibo and the North West District, and from sugar estates throughout the Colony. Some idea of the extremely rapid increase in ground provision supplies can be gained from the fact that, whereas the Georgetown Depôt in March bought little more than 100,000 lbs. of ground provisions, the same depôt purchased over a million pounds in each of the last four months of the year. Buying reached its peak in November when over one and a quarter million pounds of ground provisions were purchased.

71. Sugar estates, at Government's request, continued to devote a proportion of their cultivation to ground provisions and pulses and these supplies were of considerable assistance in meeting the shortage early in the year. In response to a request by the Sugar Producers' Association arrangements were made in February for depôt representatives to visit estates and there purchase ground provisions and pulses grown by the estates and surplus to requirements in the estate areas. The plantations were in this way relieved of transport and marketing difficulties. Imported pulses continued to be difficult to obtain during 1944, and estate grown supplies were of particular value especially as local farmers show little interest in cultivating them.

72. Throughout 1944, by direction of the Legislative Council Food Production Committee, the Depôt Organization continued to pay freight charges

and market dues on ground provisions, plantains and corn purchased at country depôts and buying points and to offer a uniform price for each type of produce wherever purchased in Demerara, Essequibo and the North West District. These concessions to farmers caused substantial depôt trading losses.

73. In June 1944 the *ad hoc* Marketing Committee recommended the extension for a definite period of three years of the existing Government guarantee that the Government Produce Depôts at Georgetown and New Amsterdam would purchase plantains, sweet and bitter cassava, eddoes, tannias, sweet potatoes, buck and bell yams, black eye and pigeon peas and dried shelled corn in unlimited quantities and at stated prices which were considered to safeguard farmers against financial loss. The Marketing Committee further recommended that to ensure adequate production during the war emergency period depôt minimum buying prices for the types of produce covered by the Government guarantee (with the exception of bitter cassava and corn) should be fixed for one year at levels higher than those of the Government guarantee. In submitting these recommendations it was stressed that very substantial trading losses would be sustained by the Depôt Organization should over-production occur. These proposals were accepted by the Legislative Council Food Production Committee and were later approved in principle by Legislative Council; the relevant prices, which were set out in the following table came into effect on July 15, 1944 :—

	Government guaranteed Price (3 years)	*Depôt Minimum Buying Price (1 year)*
Plantains	1 ¢ per lb.	2 ¢ per lb.
Sweet Cassava	½ ¢ „ „	1¼ ¢ „ „
Bitter Cassava	¼ ¢ „ „	— „ „
Sweet potatoes	2 ¢ „ „	2¼ ¢ „ „
Eddoes	1½ ¢ „ „	1–¾ ¢ „ „
Tannias	2–1/7¢ „ „	3 ¢ „ „
Buck & Bell Yams	3 ¢ „ „	4½ ¢ „ „
Black eye peas (dried; shelled)	5 ¢ „ „	8 ¢ „ „
Pigeon peas (dried; shelled)	6 ¢ „ „	6¼ ¢ „ „
Corn (dried; shelled)	2 ¢ „ „	— „ „

The oversupply of certain of the guaranteed items—particularly sweet cassava and plantains—during the second half of 1944, together with other concessions to farmers resulted in the Georgetown Depôt sustaining a trading loss for the year of $69,189.80. The New Amsterdam Depôt which was not required to handle surplus produce finished the year with a trading profit of $2,710.45.

74. Selling prices of all the types of produce listed in the foregoing paragraph continued to be price controlled in the Georgetown area and in New Amsterdam, the Controller of Prices been advised as necessary by the *ad hoc* Marketing Committee. In August, 1944, similar price control was extended to the Christianburg-Wismar-Mackenzie area of the Demerara River, and in order to guard against any shortage of supplies resulting from the imposition of price control the Georgetown Depôt supplied produce to the Christianburg Local Authority which in turn wholesaled to established hucksters in the area. This service was continued until November, 1944 when it became unnecessary to continue it.

75. Exportation of plantains to Trinidad which, as stated above, was resumed towards the end of the year was hampered by infrequent and uncertain shipping opportunities. By arrangement with the Marketing Officer, Trinidad, three trial shipments of plantains were despatched to that colony from the Georgetown Depôt and these provided valuable information.

76. There was an acute shortage of linseed oil meal and cotton seed meal during the first part of 1944 and a strict system of rationing was insti-

ruted by the Controller of Supplies. Under this arrangement the cattle feeds named were issued to stockowners through the Georgetown Depôt. Some 70 tons of 100 tons consignment of meat bone meal imported by Government to relieve the local shortage of high protein livestock feeds were taken over by the Depôt Organization in August, 1944. This meal was supplied at approximate cost price to sugar estates raising livestock as part of the food production drive and in September it was also made available to small farmers as part of the balanced ration campaign described below.

77. The general section of last year's report made mention of plans for the distribution of feed supplies through the Government Marketing Organization. These plans were put into effect in September, 1944 when two scientifically balanced rations—Dairy Meal and Layers' Mash—were made available at approximate cost price to small farmers through Government Produce Depôts and a number of distribution centres operated by District Agricultural Staff. The meat bone meal mentioned in the foregoing paragraph was similarly put on sale under the name of "Pig Supplement" to enable pig-keepers to balance the diet of pigs fed mainly on low protein feeds. By the end of the year preparation and sale of a balanced Pig Fattening Meal was also projected. The balanced feeds are compounded at the Pilot Mill, using available and suitable local and imported constituents to the best advantage, and are sold to the Georgetown Depôt which distributes for sale at the various depôts and other distribution centres. By the end of 1944 the following quantities of the various feeds had been prepared and sold to the Georgetown Depôt:—

Dairy Meal	37,400 lb.
Layers' Mash	27,222 lb.
Pig Supplement (meat bone meal)	59,293 lb.

78. The Pilot Mill building and equipment came under the control of the Marketing Branch in May 1944. As mentioned above, balanced rations were prepared in the building which was enlarged for the purpose before the end of the year. Preparation and sale of plantain flour through the Depôt was started as soon as plantain supplies showed signs of exceeding demand; this flour continues to be prepared at the time of writing. Efforts were also made to process surplus sweet cassava into cassareep, starch and meal suitable for stock feed but cost of such processing was found far to exceed the value of the products, partly because of the high buying price of sweet cassava brought about by the guarantee mentioned above, and partly because the experimental Pilot Mill equipment was not found to be efficient. No cassava flour was made during the year at the Pilot Mill as little or no bitter cassava was available while subsidised wheat flour continued to be imported in large quantities.

C.—The Research Branch.

79. *Sugar.* The breeding and testing of new varieties has placed the industry in the happy position of having a choice for varying conditions, between D. 14/33, D. 419/33, D. 14/34, D. 166/34, D. 200/36, Co. 419, Co. 421 and B. 34104, all of which are definitely higher yielders than P.O.J. 2878, the present standard. As a result the proportion of P.O.J. 2878 has fallen from 68.8 per cent. in 1942 to 54.8 per cent. for 1945.

80. Work with fertilisers has been handicapped by war conditions but some progress has been made and planters have at their disposal and are using a wealth of research findings which have accumulated by years of steady work.

81. The staff of the Sugar Experiment Station is now studying various cultural systems which might be improvements on standard local practice, and it is not unlikely that considerable mechanisation of field operations might ensue. In connection with these matters, the Sugar Agronomist and Plant Breeder undertook a mission to Barbados, Puerto Rico, and Trinidad in the latter part of the year.

82. Sugar Bulletin 13 gives detailed information on the breeding and field experimental work carried out during 1944.

83. *Rice.* Nearly 50 varieties imported from rice-growing countries abroad have been under observation in progeny rows. These imported varieties have given disappointing results, as their yields are not comparable to the local varieties. Their chief value in the future appears to be mainly as breeding material.

84. Of the new homozygous hybrids which have been under test, 11 have been selected for promotion to replicated variety trials. Two hybrids which possess relatively more stiffness of straw than the standard local varieties and show promise of adaptation to mechanical harvesting, are being put under trial on a fairly large scale at Mahaicony where experiments in mechanical cultivation are being conducted.

85. Established commercial varieties in the Colony are now D. 110, No. 79 and Blue Stick. Two medium-grained varieties, D. 255 and D. 256, are as good as, and in some seasons, better than D. 110, though their margin of superiority is not enough to warrant the displacement of such a well-established variety. Since Demerara Creole went out of cultivation some years ago in favour of higher yielding varieties, many long-grained varieties have been selected and tested for taking its place; one of these, D. 52-37, has now established itself as a higher yielding variety than any of the commercial standards, and it is proposed to build up seed supplies for its gradual extension.

86. Manurial trials point to sulphate of ammonia and pen manure as being the best treatments for low-yielding areas. Rice straw and green manure are showing beneficial effects, but increases do not appear to be significant. The importance of the farmer utilising his rice straw for conversion into pen manure with the aid of his oxen is becoming more and more stressed on our manurial experiments.

87. On new land, one ploughing has been shown to be more beneficial than two. As the land loses its initial fertility and becomes more stable, the benefit from one ploughing decreases. On old land two ploughings give better results, but the increase does not appear to be economic when compared with one ploughing.

88. Tests with harrows have proved that the local spike harrow is a better implement for local soil conditions than the Burmese harrow.

89. No definite results can yet be reported on tests of transplanting versus broadcasting, but indications are that the former gives higher yields than the latter, and the economics of the increase depends on the prices prevailing.

90. The programme financed under the Colonial Development and Welfare Act for improvements at the Rice Station was completed, with the exception of the purchase of a pump, which it has been impossible to obtain on account of war conditions.

91. *Chemistry.* The Agricultural Chemist left the Colony in January and his successor, who assumed duty in May, has undertaken various activities designed to improve the level of animal nutrition in the Colony.

92. In collaboration with other officers, the Chemist devised balanced concentrated meals for both dairy cattle and poultry. These were sold by the Government Produce Depôt under the names of "Dairy Meal" and "Layers' Mash" respectively. A drive to provide pigs with a well balanced ration from available feeding stuffs was also made, and pig-keepers were urged to make use of waste ground provisions, supplemented with a prescribed proportion of meat and bone meal, the latter being marketed through the Government Produce Depôt under the name of "Pig Supplement." A further series of feeding trials drew attention to the value of molasses as a cheap food for pigs, and it was shown that its feeding value was not impaired by changes in composition resulting from storage for about two years. Towards the end of the year feeding trials were commenced with a view to marketing a fully balanced "Pig Fattening Meal" similar to "Dairy Meal" and "Layers' Mash."

93. With a view to assessing the relative feeding value of various grasses and legumes at different stages of growth, trial plots were laid out at the

Botanic Gardens in collaboration with the Curator. At Paradise Experiment Station, in collaboration with the Agricultural Superintendent, East Coast Demerara, an experiment was carried out to compare the yield and nutritive value of successive cuts of Kavirondo sorghum on manured and unmanured plots. At Middlesex Experiment Station, the Assistant Agricultural Superintendent, West Coast Demerara, collaborated in laying out plots of Guatemala grass, Para grass, Kavirondo sorghum and Guinea corn to compare their yield and nutritive value on semi-pegasse soil.

94. In order to determine their feeding value, and for the purpose of devising balanced rations, various by-products were collected and analysed, among these being samples of yeast, rice and coconut oil by-products, linseed meal, meat and bone meal, ground provision meal and shark meal.

95. The testing of farmers' canes was continued in 1944, and the prices fixed by the Committee, of which the Chemist is Chairman, gave general satisfaction.

96. Miscellaneous investigations included soil analysis in connection with experimental mechanical cultivation; water analysis for the Government Malariologist; milk analysis with a view to assessing the effects of breed, individual idiosyncrasy, season, etc. on composition; and experimental parboiling and milling of samples of padi of various varieties. In all 1,063 samples were analysed by the Division in 1944.

97. *Fisheries.* The Fisheries Committee was again without an executive officer, and the most important event during the year was a further visit by Dr. H. H. Brown, Director of Fisheries Investigations under Colonial Development and Welfare. He was of the opinion that a senior specialist officer in charge of fisheries was necessary; such a man was unlikely to be available for some time, and in the meantime Dr. Brown suggested that a small division of fisheries should be established within the Department of Agriculture, and a junior Fishery Officer appointed. The position of this officer, and his relations with fishermen, would be much the same as a district agricultural officer with the farmers. Among his various duties would be the organisation of marketing schemes, the fostering of fishermen's associations, the institution of systems for the collection of catch and landing statistics, and the dissemination of information resulting from research. This officer would also keep a register of boats, gear and fishermen, would be responsible for enforcing legislation, and would be expected to carry out various *ad hoc* investigations in sea and fresh water fisheries. He would receive immediate direction from a specialist officer in the Department of Agriculture and with guidance from the Fisheries Director (Colonial Development and Welfare).

98. While he was in the Colony Dr. Brown with Mr. R. T. Whiteleather, Fishery Technologist of the United States Fish and Wildlife Service (Department of Interior), gave a demonstration of the use of a trawl net to catch bottom fish. This trawl, which is similar to the type used in the North American shrimp industry, has been specially modified by Dr. Brown and Mr. Whiteleather for use in the waters of the Gulf of Paria and off British Guiana; it represents the efforts of the Anglo-American Fishery Survey to apply proved commercial fishery methods to these waters so as to improve the supply of fish. The trawl, which is like a large butterfly net, is designed to drag along the bed of the ocean, while the vessel is moving. It is hoped that it will be an improvement over the Chinese seine or pin seine, stationary apparatus, ordinarily used at present by British Guiana coastal fishermen.

99. *Botany.* Owing to limitation in staff, little botanical research work was undertaken, but, in addition to maintaining the Jenman Herbarium, the family *Gramineae* received special attention. Many grasses from various parts of the Colony were sent in for identification, which were considered to have possibilities as fodder and pasture grasses. Including grasses and other plants 150 specimens were received for determination. Some twenty species, however, were new to the herbarium collection.

100. *Entomology.* A survey of the natural enemies of the Demerara sugarcane froghopper was undertaken soon after the newly appointed Entomologist

assumed duty in June, because the prospect of control by biological means appeared more promising than any other. Particularly was it desirable to ascertain whether those forms are represented in British Guiana which give some measure of control of the Trinidad froghopper (*Tomaspis saccharina* Dist.). An investigation of the egg parasites of the Demerara froghopper (*T. flavilatera*) disclosed that there are at least two species of parasites one of which has quite a significant control value. They belong to the genus *Anagrus* of the family *Mymaridae* which are the most minute of known insects; they are also new to science and have been sent to the Imperial Institute of Entomology for description. Specimens of the parasites have been obtained from every batch of froghopper eggs which have been so far examined and their control value is undoubted. The only previous record of an egg parasite from the Demerara froghopper was that of Mr. C. B. Williams in the Bulletin of Entomological Research Vol. II, September 1918, in which he mentions Vermilion parasite (*Oligosita giraulti*) as a probable parasite. The Vermilion parasite has not been bred from froghopper eggs during the present work and it seems likely that it is an occasional rather than a specific parasite of *flavilatera*.

101. The general import of the work on egg parasites suggests that the degree of control from this source exerted on the Demerara froghoppers is greater than that exercised on the sugar-cane froghopper of Trinidad. A valuable biological agent of control frequently found among froghoppers of most species is the predaceous syrphid maggots of the genus *Salpingogaster*. The species *S. nigra* was easily found at Plantation Cane Grove and whilst doing good work never achieved the degree of control which a study of its potentialities suggests it should attain. Possibly the principal reason for the failure of this useful predator to become a dominant controlling factor is the inability of the maggots to migrate from stool to stool; thus whilst maggots may be starving on one stool a neighbouring one may lack sufficient to effect a "clean up." However, two parasitised puparia of *Salpingogaster* were eventually obtained, but this parasite (*Aphidencyrtus* spp.) has not yet been observed to be sufficiently prevalent to enable it to be regarded as the principal limiting factor to the increase of *Salpingogaster*. The introduction of additional species of *Salpingogaster* into infested areas is unlikely to increase the total amount of control exercised by this type of predator.

102. A natural enemy of froghoppers which it is claimed gives a high-control of the Trinidad species under conditions of high humidity was not found although systematically searched for during a period of several weeks. This enemy is the Green Muscardine Fungus (*Metarrhizium anisopliae* Sorokin), and although quite a considerable number of nymphs infected with the fungus were collected, more especially from areas where control by flooding has been attempted, they never in any single instance produce spores of the typical Green Muscardine shape and colour. Moreover, in all specimens examined it was difficult to decide whether the infection had begun during the lifetime of the insect, that is to say whether the fungus concerned was parasitic or saprophytic. Further it was also considered most desirable that the strain of the Green Muscardine Fungus which actually infects the Trinidad froghopper should be given a trial against the Demerara froghopper. Consequently the introduction of the fungus was decided upon and through the courtesy of the Director of Agriculture, Trinidad and the Entomologist of the same Department, a number of infected adults were despatched by air mail and arrived in the Colony on October 23, 1944. Work is continuing on this fungus.

103. A beginning has been made with systematic examination of the new insecticides which the war has brought into prominence. A very detailed series of tests conducted in triplicate was made with a D.D.T. dust insecticide against the rice weevil (*Calandra oryzae*), a full account of which will be found in the January, 1945 issue of the Farm Journal of British Guiana. In these experiments the minimum dosage employed consisted of one part of the insecticide to 50,000 parts of rice and it sufficed to destroy all the test insects in seventy-two hours. However, further work is required on the reaction of man and stock to D.D.T. even in the small quantities necessary for weevil control before it can be safely considered even for stock. Also in the case of stored products such as rice, there is the alternative of non-poisonous dusts which produce their lethal effect more by physical than chemical action.

104. Experiments in this field of possibility are now being conducted with several of the more promising non-poisonous dusts and a final recommendation will not be made until these have been carefully compared as regards effectiveness, cost and innocuousness to man and stock.

105. The usual advisory work in connection with pest control of minor crops was carried out and the entomological collection maintained.

D.—The Livestock Branch.

Government Stock Farm, Georgetown.

106. The farm is in the charge of the Livestock Officer provided under Colonial Development and Welfare and he is also responsible for advisory work in animal husbandry on the coastlands.

107. *Cattle.* The number of cattle on the farm at December 31, were :—

Breed	Bulls	Cows	Heifers	Calves Bulls	Calves Heifers	Total
Holstein	5	8	1	—	1	15
Red Poll	1	2	—	—	1	4
Zebu	3	—	1	—	—	4
Creole	—	6	—	—	—	6
Grade Holstein	2	—	—	15	—	17
Holstein x Red Poll x Creole	—	—	—	—	1	1
Red Poll x Creole	—	3	—	—	—	3
Zebu x Creole	7	—	—	2	3	12
Holstein x Zebu	—	2	1	1	3	7
Red Poll x Creole x Creole	—	—	—	2	—	2
Red Poll Zebu	—	—	—	—	1	1
Total	18	21	3	20	10	72

108. Included in the above table are 12 grade Holstein bull calves purchased from sugar estates and three of the five pure bred Brahman Zebu cattle imported from Texas; the other two were sent to Anna Regina. These Zebus are to be used for the production of Holstein-Zebu grades for sale to farmers and use in District Breeding Centres. During the year, 15 cattle were sold for breeding purposes, 10 bulls were sent out to District Breeding Centres and two Red Polls were transferred to Anna Regina. Some 220 cows belonging to local farmers were bred at the farm in addition to 62 Government cows. 14 cows were milking during the year, the amount of milk produced being 49,934 lb., most of this being used for feeding to calves, pigs, etc. Owing to the non-arrival of certain equipment for new buildings, accommodation for the large increase of stock on the farm was somewhat of a problem.

109. *Poultry.* As in 1943, Rhode Island Reds and Barred Rocks were the breeds kept on the farm and breeding pens consisted of 262 Rhode Island Reds and 262 Barred Rocks, making a total of 524 as compared to a total of 553 in 1943. Egg production was 55,625 as compared with 51,608 for 1943. The availability of meat and bone meal as protein was chiefly responsible for the better egg production. The electric incubator and brooder were run at full capacity except for the months of September and October when they were overhauled and cleaned. Some 11,991 chickens and cockerels were sold to farmers in the districts as compared with 9,960 sold in 1943, and a total of 32,610 eggs were sold, including 1,010 sold for setting purposes. Two pens of Barred Rocks and one pen Rhode Island Reds, each pen consisting of 10 hens and two cockerels, were imported from Canada in order to keep up the vigour of the fowls.

110. *Pigs.* The pigs continued to do well throughout the year although three sows died from some unknown cause and three sows were sold for slaughter owing to their being barren. Some 150 young pigs were sold for breeding purposes including three which were sold to the Government of the Leeward Islands. Six more were sent out to District Breeding Centres. Feeding experiments with six pigs were also carried out. Two boars and two sows were imported from Canada to prevent in-breeding and to maintain the high level of the herd. At the end of the year the herd consisted of five boars, 24 sows, six experimental animals and 46 piglings, the latter being earmarked for sale in early 1945.

111. *Sheep.* The flock of Black Headed Persian sheep maintained only fair health during the year, as they were constantly developing foot trouble and parasitic infestation. The heavy cold clay soil at the farm does not appear to favour sheep raising. Two rams were sent out to Breeding Centres. The stock at December 31 was three rams, six ewes and four lambs. Some 27 ewes were served at the farm. Further reference to these sheep will be found under Breeding Centres. It is intended to transfer the ewes to Ebini Experimental Station where the lighter soils there may be more suitable.

112. *Goats.* Local goat-keepers have been keen throughout the year for the use of the two Alpine billies on the farm; 60 nannies were served and the resultant kids are good strong animals. Two nannies on the farm were in milk during the year and both gave promise of being heavy milkers.

113. *Donkeys.* Another Kentucky Jack was imported during the year and 29 local donkey mares were served. One half-bred stallion was sent to Anna Regina for stud purposes but the response was poor.

114. *Rabbits.* A rabbitry was started on the farm by the purchase of 32 rabbits locally. Importations were made from Barbados and Trinidad of Flemish Giants and Havana-Rex. There is very little demand for rabbits from local farmers, but 10 does were served during the year.

FODDER AND PASTURE CROPS—SOILING UNITS.

115. *Ebini.* The cultivated pasture of 60 acres supplied a large amount of grazing throughout the year, especially during the rainy season when growth was very rapid and more animals were put in the pasture. A light discing was given to one of the older fields and the whole area was cleared of weeds.

116. Wynne grass (*Melinis minutiflora*) and Bahama grass (*Cynodon dactylon*) are the two most important grazing species, the habit of the former in seeding once annually prevents its more rapid expansion. *Andropogan ischaemum* and A. *pertusus* introduced from the coastlands, are being tried out under field conditions, and have given indications of being good grazing grasses for the area. *Indigofera endecaphylla* has been extended to eight acres but, unfortunately, the coushi ants kept it well clipped before it had become established, and thus hindered its growth and spread. One acre of pigeon peas was cultivated and lightly grazed, and it is expected to extend the area of this valuable legume as early as possible.

117. The following indigenous grasses and legumes have been collected and identified by the Botanical Division:—*Trachypogon plumosus, Axonopus aureus, Axonopus stragulus, Andropogon virgatus, Andropogon leucostachyus, Dactyloctenium aegyptium, Eragrostis maypurensis, Paspalum melanospermum, Paspalum multicaule, Paspalum Abrahami, Leptocoryphium lanatum, Stylosanthes guianensis, Stylosanthes viscosa, Stylosanthes gracilis, Stylosanthes augustifolia* and *Zorina diphylla.* Observations are being carried out on those which promise any utility.

118. *Soiling Units.* The units at Paradise, Toevlugt, No. 63 and Unity which were complete with a heifer were maintained during the year. The heifer at Paradise calved in October and she yielded 425 lb. of milk in November and 627 lb. in December. The heifer at Unity was due to calve in February 1945, while the heifer at Toevlugt which calved in April, had to be returned to the Livestock Farm for veterinary treatment and care. More units were commenced at Bath; Leguan; Wakenaam; Queenstown, Essequibo and Mahaica. These have not yet been completed and there has been difficulty in obtaining heifers for the units. More villages are becoming interested in forage blocks and this work will be extended in the near future.

BREEDING STATIONS.

119. *Cattle.* 23 bulls, principally Holstein and Holstein-Zebu, were at breeding stations in the districts (one more than in 1943) and 1,058 cows were bred as compared with 713 in 1943. Included in this amount are 355 agisted cattle bred to Red Poll bulls at Anna Regina. Total services including those at the farm were 1,340. This increased interest was most marked in the East Demerara District but interest also improved in all districts. Various compe-

titions which were held in the districts helped to maintain interest (see para. 65). Competitions for the best cow pen and pig pen were held at Beterverwagting, Plaisance and Mahaica. It was pleasing to see what can be done by using local materials in building quite fair pens.

120. *Pigs.* Boars were stationed at Beterverwagting, Buxton, Paradise, Ann's Grove, Uitvlugt, Catherineville, Leguan, Hosororo and Queenstown, Essequibo. Services totalled 232 an increase over the total of 131 in 1943. The improvement in the pig population is now very evident especially on the East Coast, Demerara and better carcasses are to be seen at the slaughter houses.

121. *Sheep.* Black Headed Persian rams were at stud at Paradise, Uitvlugt, Providence, Anna Regina and Ogle and services were 101 for the year, making with services at the Stock Farm a total of 128.

122. *Mule Breeding Station, Ogle.* The Belgian stallion had 11 services on Creole mares while the Kentucky Jack had five services on Creole mares during the year. Eight foals from the Belgian stallion and Creole mares served in 1943 were born in 1944. Of these two fillies and two colts died. Two mules were born at Uitvlugt and were good type riding mules. It is intended to try and get more interest in this scheme during 1945.

123 *Summary.* Total number of services performed by Government sires at the Central Stock Farm and out-stations on the coastlands are given below for the years 1943 and 1944:—

	1943	1944
Cattle	849	1,340
Pigs	131	232
Sheep	87	128
Goats	15	60
Donkeys	14	32
Mares	3	16
Total	1,099	1,808

Livestock Experiment Station, Ebini Downs.

124. Progress has been made in the investigations of the problems of livestock production on the mineral deficient soils of the savannahs. There now appears to be a good chance of utilizing these savannahs for beef, using Zebu blood in the breeding, providing, however, that minerals are fed and the herbage improved. Further reference to the pasture work will be found in para. 115. It will now be possible to extend the programme so as to give more attention to studies on the economic side. The Government Veterinary Surgeon, who is in charge of the station, reports that the livestock maintained good health and condition throughout the year due to adequate intake of mineral supplement. At the year's end there were 176 head of cattle, 25 sheep, two horses, one mule and 75 poultry. 45 half bred Zebu calves were born, and the mortality rate was low—three cows and one calf. The Black Headed Persian sheep kept very fat condition—15 lambs were born, but seven lambs died very soon after birth which may possibly be caused by a low mineral intake or inbreeding. Two well grown yearling bulls and two rams were sold at public auction when very good prices were realised. The Barred Plymouth Rock birds are well adapted to the high sandy soil of the station, and it is proposed to extend their breeding pens; 4,207 eggs were sold for hatching purposes.

125. The citrus orchard of 90 trees has had its first crop this year of fair-sized fruit of good quality. The grafted mangoes and avocado pears have not done well and are to be replaced by hardier varieties.

Hinterland and Cattle Trail.

126. *Rupununi Savannahs.* The Government Veterinary Surgeon visited the Rupununi district in February *via* the Cattle Trail, and again in September with the Veterinary Officer of the district, and investigated an outbreak of disease of horses at Dadanawa which was diagnosed as Mal de Caderas caused by *Trypanasoma equinum.* Many cases of mange of horses had also been reported

by the Veterinary Officer and the whole district was quarantined for both diseases. The Veterinary Officer, Dr. Black, was kept very busy attending many of the cattle-horse round-ups, and giving general advice on animal husbandry to the ranchers; he also carried out control of the quarantine areas and investigated other reports of disease. At the frontier 1,844 bullocks were inspected, for entry into the Colony for the coastland abattoirs.

127. Livestock census for the district shows: cattle 44,533; horses and mules 1,330; sheep 293; goats 106; pigs 285. Stock owned by Macusi and Wapisiana Indians number: cattle 1,967; horses 160; pigs 264.

128. The Director of Agriculture visited the district by plane in March and inspected the Veterinary Officer's quarters and laboratory in the course of erection, and discussed livestock problems with those interested.

129. *Mazaruni-Potaro District.* The Government Veterinary Surgeon visited the district with the District Commissioner and the Food Production Officer from April 13 to May 1. This is a mining district with very small and isolated herds of tame cattle. At Tumereng, Mazaruni, a very good herd of 50 grade Holstein and Creole cattle was seen on pasture, some of the cows giving 10 to 12 pints daily on grass alone. The pastures were made from cleared forests lands and planted with grasses—chiefly *Paspalum conjugatum, Axonopus compressus, Ischaemum ciliare* and *Cynodon dactylon.*

130. *Cattle Trail.* The Government Veterinary Surgeon accompanied the Cattle Trail Warden in February to inspect the work of the trail. The bridge across the Ituni creek was completely rebuilt, all the camps and paddocks at Nos. 61½ and 71 miles, and Charabara have been thatched and weeded. At Kurupukari new corrals have been built on both banks of the river, and labourers' houses and storeroom have been repaired and re-roofed. The trail between Canister Falls and Kurupukari has been badly eroded, in some cases with gullies 20 to 25 feet deep requiring new trails to be cut around these areas. Two pack bullocks were purchased for use on the trail, and after the first season's work, one died and the other is in very poor condition. All bush and fallen trees along the 184 miles of trail have been cleared to permit the drivers of cattle to proceed from the savannahs to the coastland.

Veterinary — Animal Health.

131. No notifiable disease was reported from the coastland, but the Rupununi district was quarantined for Mal de Caderas and Mange of horses. Veterinary inspection and treatment of Police troop-horses, and inspections of imported animals were made. Clinical treatment of animals increased considerably at the Government Stock Farm and out-stations, as well as in the villages on the coastland.

132. E.—Colonial Development and Welfare.

Scheme	Period	Amount of grant.
Grant to B.G. Beekeepers' Association D.13(t)	3 years	£ 150
Appointment of Livestock Officer, D.72	5 years	£5,700
Appointment of Marketing Officer, D.141	5 years	5,207
Livestock Production Soiling System D.142	2 years	1,500
Extension of Government Stock Farm and buildings for Apprentices D.190	5 years (capital: £11,300 maintenance: £20,000)	31,300
Improvement Rice Experiment Station D.120	1 year	1,000
Marketing Depôts D.118	3 years	2,000
Erection of quarters and laboratory for Veterinary Officer and purchase of equipment £700		
Salary of Veterinary Officer, passages, etc. D.175 .... £5,300	5 years	6,000
Anna Regina Settlement Scheme D.157		4,225

F.—Agricultural Economics, Statistics and Publications Branch.

133. In economics routine work in regard to the provision of statistical data continued. Work was, however, in the main connected with investigations undertaken at the request of the Colonial Development and Welfare Organisation on the economic-sociological aspects of a series of schemes planned to provide controlled drainage-irrigation for the Colony. About eight major schemes have been proposed by the Engineers' Department, each more or less independent and costing a total of some $14,000,000. As the sums involved were of such proportions more factual information on the economic and sociological implications of each scheme was considered necessary, and a detailed land occupancy survey of the areas concerned was undertaken. Figures were obtained for the areas extending from the Courentyne River on the eastern boundary of the Colony to and including the Pomeroon River areas. This entailed a study of most of the agriculturally occupied land of the Colony, and although some of the information was available in the case of sugar estates, the position was not the same for peasant farms and settlements. Reports were submitted to Government and published.

134. One off-shoot of this work has been the bringing into existence of a Colony-wide organisation consisting of representatives in every farming community. This loosely knit organisation has direction centralised in the Department of Agriculture and promises to be of service in connection with census reports and crop forecasting for the future.

Publications.

135. The *Farm Journal* was published quarterly and the demand for it is steadily increasing. Two "Growmore" Leaflets were published : *Balanced Rations for Livestock* and *Sweet Cassava—Harvesting and Preparation for Market.* Other publications included : *Sugar Bulletin No.* 13; *Food Production Report for* 1943 (Leg. Co. Paper No. 9/1944) ; *Social and Economic Aspects of Drainage and Irrigation Schemes, No.* 1 *Corentyne Coastlands* Leg. Co. Paper No. 17/1944) ; *Social and Economic Aspects of Drainage and Irrigation Schemes, No.* 2 *East Demerara* (Leg. Co. Paper No. 23/1944) ; *An Improved Water Lift* (Tropical Agriculture, Vol. XXI, No. 11, p. 214). The Library was maintained and the usual indexing and distribution of periodicals carried out.

G. The Co-operative Credit Banks' Branch.

136. The Credit Banks, under the chairmanship of District Agricultural Officers, operated under the provisions of Ordinance No. 28 of 1933, up to June 30, and from July 1, under Ordinance No. 16 of 1944.

137. This new Ordinance for co-operative credit banks provides for cheaper and greater credit facilities on good security, with a view to extending the usefulness and increasing the business of these banks. A new and larger Co-operative Credit Banks' Board, consisting of seven members has been appointed, with the Director of Agriculture *ex officio* Chairman, and the Registrar of Banks, Secretary to the Board.

138. There were still 29 banks on the register on December 31, four of which are in course of liquidation. At the close of the year the membership of the 25 functioning banks stood at 12,752. West Indians owned 52,659 shares and East Indians 26,196 shares out of a total issue of 85,488 shares.

139. The lending capital of the banks is derived from two main sources —share capital and Government loans. The paid-up share capital amounted to $85,487.49 and the Government loans owing at the end of the year totalled $141,694.72. At the close of the year loans totalling $250,018.03 and interest totalling $7,793.54 were outstanding, and it should be stated here that slightly over 81 per cent. of outstanding loans and 93 per cent. of outstanding interest relate to the years 1943 and 1944.

140. Below comparison is made of the business done during the past five years:—

Year.	Share capital of banks.	Government loans to banks.	Loans made by banks.	Loans recovered by banks.	Interest collected.	Loans outstanding.
	$	$	$	$	$	$
1940	72,498	12,462	46,288	37,112	9,708	93,300
1941	71,050	39,609	75,318	50,311	11,772	119,300
1942	77,836	53,725	103,806	72,264	15,678	150,519
1943	82,597	89,742	135,712	84,399	18,549	200,897
1944	85,487	141,694	147,632	98,492	21,216	250,018

141. In addition to the foregoing, the machinery of the banks was again made use of by Government for making loans to rice growers under the provisions of the Rice Growers' Loans Ordinance, Chapter 155, for reaping, bagging and transporting the 1944 Autumn padi crop. The position in regard to these advances at December 31, is as under:—

	Advances	Repayments	Outstanding
1940	$ 18,438.00	$ 18,410.00	$ 28.00
1941	45,410.00	44,313.24	1,096.76
1942	41,730.16	37,358.41	4,371.75
1943	19,078.00	15,615.28	3,462.72
1944	56,007.72	11,717.59	44,290.13
	$180,663.88	$127,414.52	$53,249.36

SECTION III.

ADMINISTRATION—BOARDS AND COMMITTEES.

142. Consideration of the report will show that the year has been one of great activity and work has continued at full pressure. The position has been accentuated by staff changes, notably in the field branch, which has been depleted of some of its experienced officers for special duties. Advisory work in collaboration with other Departments notably in connection with war measures, imports, exports and price control has been fully maintained.

143. I desire to record my appreciation of the efforts made in all divisions of the Department including the clerical branch which is very inadequately staffed.

144. *Boards and Committees.* The Director of Agriculture served on the following Boards and/or Committees:—

Advisory Agriculture and Fisheries Committee (Deputy Chairman).
Sugar Experiment Stations' Committee (Chairman).
Co-operative Credit Banks' Board (Chairman).
Legislative Council Food Production Committee (Member).
Produce Depot Committee (Deputy Chairman).
Rice Marketing Board (Member).
Education Development Committee (Member).
Sub-Committee—Prevocational Training-Supervising Teachers, 4-H Clubs (Chairman).

In addition the Deputy Director and practically all divisional heads served on one or more committees during the year.

145. The Advisory Committee on Agriculture and Fisheries, the formation of which was fully reported on in last year's report, met monthly during the year and considered all important matters relating to policy and expenditure. This committee provides the valuable link between the Department

and the Legislature of the Colony. The membership comprises the following: Hon. J. I. deAguiar (Chairman); Director of Agriculture (Deputy Chairman); Hon. F. J. Seaford, C.B.E.; Hon. Peer Bacchus, Hon. Vincent Roth, Hon. T. Lee and Hon. C. V. Wight, M.A.

146. Important visitors to the Department during the year included: Dr. H. H. Brown, Director of Fisheries Investigations, Colonial Development and Welfare; Dr. Eric Williams, Secretary, Anglo-American Caribbean Research Council; Prof. J. L. Simonsen, D.S.C., F.R.S., Director of Research of the Colonial Products Research Council and Prof. Sir Robert Robinson, D.S.C., LL.D., F.R.S., a member of the Council; Dr. A. King, member of the British Commonwealth Scientific Office, Washington; Dr. B. S. Platt, Director of the Human Nutrition Unit of the Medical Research Council and Dr. A. L. Van Exel, Director of Social and Economic Affairs, Paramaribo.

SECTION IV.

SUMMARY OF AGRICULTURAL LEGISLATION ENACTED DURING 1944.

147. An Ordinance to Repeal the Produce Protection Ordinance, Chapter 157 (Ordinance No. 14 of 1944).

An Ordinance to Consolidate and Amend the Law Relating to Co-operative Credit Banks (Ordinance No. 16 of 1944).

J. SYDNEY DASH,

Director of Agriculture.

July 2, 1945.